

LAMPIRAN

Lampiran 1: CoA Adapalene



AARTI INDUSTRIES LIMITED

Factory : Unit - IV, Plot No. E-50, MIDC, Tarapur,
Taluka & District- Palghar, Pin - 401508, Maharashtra, INDIA.
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CERTIFICATE OF ANALYSIS

ADAPALENE BP

Batch No. : AD-18202/JM-011-501RP		Date of Mfg. : JUN-2018	
A.R. No. : FC10484/18		Date of Exp. : MAY-2023	
Batch Qty. : 22.27 Kg		Date of Release : 22/08/18	

Sr. #	TESTS	RESULTS	SPECIFICATION
1.	Description	Almost white powder	White or almost white powder.
2.	Solubility	Complies	Sparsely soluble in Tetrahydrofuran, Practically insoluble in water and ethanol (95%).
3.	Identification A) By IR	Complies	The infra red spectrum of sample should concordant with similar preparation of that of Adapalene B.P.
	B) By HPLC	Complies	The retention time of the major peak of the sample solution corresponds to that of standard solution, as obtained in the assay.
4.	Appearance of Solution	Complies	The solution is clear and not more intensely coloured than reference solution (By).
5.	Related substances (By HPLC)	Below disregard limit	Impurity A : Not more than 0.3%
	Below disregard limit	Impurity C : Not more than 0.13%	
	Below disregard limit	Impurity D : Not more than 0.2%	
	Below disregard limit	Unspecified impurities : Not more than 0.10%	
	Below disregard limit	Total impurities : Not more than 0.5%	
6.	Heavy metals	Complies	Not more than 20 ppm
7.	Loss on drying (At 105°C for 4 hours)	0.19 %	Not more than 0.5 %
8.	Sulphated ash	0.04%	Not more than 0.1 %
9.	Assay (By HPLC)	100.27 %	Between 98.0 % to 102.0 % on dried substance
10.	Residual solvents (By HSQC)	Not detected	Dichloromethane : NMT 600 ppm
		27 ppm	Ethyl acetate : NMT 5000 ppm
		113 ppm	Tetrahydrofuran : NMT 720 ppm
		640 ppm	Toluene : NMT 890 ppm
		Not detected	Diglyme : NMT 500 ppm
		10 ppm	Not more than 80 ppm
11.	Triethylamine content (By HSQC)		

Remark: The material complies as per BP and above specifications.

Analyst	Checked By	Approved By
<i>Vikas Pardiya</i> Vikas Pardiya Analyst	<i>Mahendra Girse</i> Mahendra Girse Head Quality Control	<i>Shyamsundar Desai</i> Shyamsundar Desai Head Quality Assurance

AARTI INDUSTRIES LTD.
Unit - IV, Plot No. E-50,
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Lampiran 2: Basis NLC

Kode	Pengukuran 1		Pengukuran 2		Pengukuran 3	
	size	Pdi	size	Pdi	size	Pdi
GAC	194,60±1,64	0,54±0,06	423,85±0,78	0,19±0,22	3477,00±1,41	0,97±0,04
GAP	116,73±1,7	0,44±0,02	196,23±1,96	0,36±0,02	1606,00±1,41	1,0±0,00
GAT	122,03±1,12	0,16±0,03	199,55±0,78	0,18±0,00	212,05±0,78	0,24±0,00
GMC	113,53±1,8	0,27±0,05	238,2±1,7	0,29±0,06	618,7±1,56	0,57±0,00
GMP	71,98±0,72	0,25±0,01	146,95±0,21	0,28±0,03	467,65±1,48	0,77±0,00
GMT	160± 1,56	0,16±0,00	162,87±0,49	0,21±0,00	163,23±0,72	0,19±0,01

Lampiran 3: NLC Adapalene

Kode	Pengukuran 1			Pengukuran 2			Pengukuran 3		
	Zeta	size	Pdi	Zeta	size	Pdi	Zeta	size	Pdi
GAT	-47,9 ±0,57	90±0, 36	0,24 ±0,01	46,9 ±0,99	178,03 ±0,01	0,27 ±0,50	-44± 0,28	307,6 ±1,21	0,41± 0,03
GMT	-46,20 ±1,47	154,5 ±1,77	0,21 ±0,01	43,7 ±0,85	162,75 ±0,49	0,24 ±0,02	-41,1 ±0,28	177,1 ±1,56	0,15 ±0,00

Lampiran 4: Data stabilitas dipercepat NLC Adapalene

Kode	Pengukuran 1			Pengukuran 2		
	Zeta	size	Pdi	Zeta	size	Pdi
GMT	-12,6 ±1,27	84,86 ±1,02	0,18 ±0,01	-8,55 ±55	1944,25 ±1,06	0,88 ±0,17

Lampiran 5: Efisiensi Penyerapan

Perhitungan pembuatan adapalene:

- Larutan induk

$$100\text{ppm} = \frac{\text{bobot Adapalene}}{\text{volume}} = \frac{\text{bobot adapalene}}{100\text{ml}}$$

$$= 100\text{ppm} \times 100\text{ml} = 10.000\mu\text{g}$$

$$\text{bobot adapalene} = 10\text{mg}$$

- Pengenceran

1 ppm

$$V1 \times C1 = V2 \times C2$$

$$V1 \times 100\text{ppm} = 10\text{ml} \times 1\text{ppm}$$

$$V1 = \frac{10\text{ml} \times 1\text{ppm}}{100\text{ppm}} = 0,1\text{ml}$$

2 ppm

$$V1 \times C1 = V2 \times C2$$

$$V1 \times 100\text{ppm} = 10\text{ml} \times 2\text{ppm}$$

$$V1 = \frac{10\text{ml} \times 2\text{ppm}}{100\text{ppm}} = 0,2\text{ml}$$

3 ppm

$$V1 \times C1 = V2 \times C2$$

$$V1 \times 100\text{ppm} = 10\text{ml} \times 3\text{ppm}$$

$$V_i = \frac{10\text{ml} \times 3\text{ppm}}{100\text{ppm}} = 0,3\text{ml}$$

4 ppm

$$V_1 \times C_1 = V_2 \times C_2$$

$$V_1 \times 100\text{ppm} = 10\text{ml} \times 4\text{ppm}$$

$$V_i = \frac{10\text{ml} \times 4\text{ppm}}{100\text{ppm}} = 0,4\text{ml}$$

5 ppm

$$V_1 \times C_1 = V_2 \times C_2$$

$$V_1 \times 100\text{ppm} = 10\text{ml} \times 5\text{ppm}$$

$$V_i = \frac{10\text{ml} \times 5\text{ppm}}{100\text{ppm}} = 0,5\text{ml}$$

6 ppm

$$V_1 \times C_1 = V_2 \times C_2$$

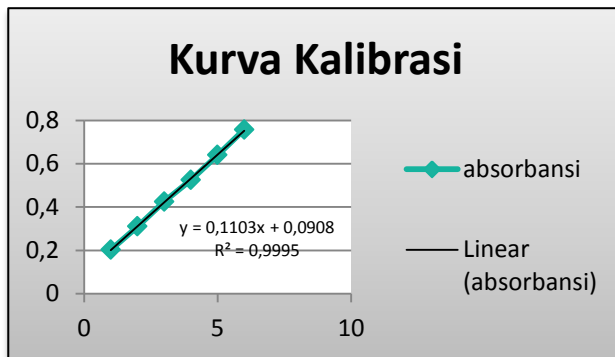
$$V_1 \times 100\text{ppm} = 10\text{ml} \times 6\text{ppm}$$

$$V_i = \frac{10\text{ml} \times 6\text{ppm}}{100\text{ppm}} = 0,6\text{ml}$$

- Kurva kalibrasi

Larutan Standar (ppm)	Absorbansi
1	0,203

2	0,311
3	0,425
4	0,525
5	0,64
6	0,758



- Perhitungan EE

GAT	GMT
Pengukuran 1	Pengukuran 1
$kadar = \frac{y - a}{b} = \frac{0,683 - 0,0908}{0,999}$ $= 0,5928ppm$	$kadar = \frac{y - a}{b} = \frac{0,524 - 0,0908}{0,999}$ $= 0,4336ppm$
$adapalene\ bebas$ $= 0,5928ppm \times 10ml \times 10$ $= 59,2793\mu g = 0,0593mg$	$adapalene\ bebas$ $= 0,4336ppm \times 10ml = 4,336\mu g$ $= 0,004336mg$
$\%EE\ NLC\ adapalene$ $= \frac{90 - 0,0962}{90} \times 100\% = 99,90\%$	$\%EE\ NLC\ adapalene$ $= \frac{90 - 0,0043}{90} \times 100\% = 99,99\%$

Pengukuran 2	Pengukuran 2
$kadar = \frac{y - a}{b} = \frac{0,633 - 0,0908}{0,999}$ $= 0,5427ppm$	$kadar = \frac{y - a}{b} = \frac{0,308 - 0,0908}{0,999}$ $= 0,2172ppm$
<i>adapalene bebas</i> $= 0,5427ppm \times 10ml \times 100$ $= 542,7427\mu g = 0,5427mg$	<i>adapalene bebas</i> $= 0,2172ppm \times 10ml \times 10$ $= 21,72\mu g = 0,0217mg$
<i>%EE NLC adapalene</i> $= \frac{90 - 0,5427}{90} \times 100\% = 99,10\%$	<i>%EE NLC adapalene</i> $= \frac{90 - 0,0217}{90} \times 100\% = 99,96\%$
Pengukuran 3	Pengukuran 3
$kadar = \frac{y - a}{b} = \frac{0,535 - 0,0908}{0,999}$ $= 0,4446ppm$	$kadar = \frac{y - a}{b} = \frac{0,258 - 0,0908}{0,999}$ $= 0,1673ppm$
<i>adapalene bebas</i> $= 0,4446ppm \times 10ml \times 200$ $= 889,2893\mu g = 0,8893mg$	<i>adapalene bebas</i> $= 0,1673ppm \times 10ml \times 50$ $= 83,6836\mu g = 0,0837mg$
<i>%EE NLC adapalene</i> $= \frac{90 - 0,8893}{90} \times 100\% = 98,52\%$	<i>%EE NLC adapalene</i> $= \frac{90 - 0,0837}{90} \times 100\% = 99,86\%$

Lampiran 6: formula NLC Adapalene